

Signalling in the Anglo-Zulu War, 1879. Part 2

By Lt. Col. David Mullineaux (Retd.)

Introduction

The first part of this article, published in the December 2003 issue of the Journal, described the principal army signalling operations carried out in the war but deferred an account of the improvised signalling carried out between Fort Pearson and Eshowe in the period from 11 February to 3 April 1879, when Eshowe was besieged. It is now time to return to that topic.

A brief review of the circumstances will set the background. On 12 January the eastern column, under the command of Colonel Charles Pearson invaded Zululand, crossing the Tugela river from its base at Fort Pearson. The fort was situated on an eminence on the south bank, near the lower Tugela drift, and the colonial telegraph system, which in anticipation of the war had been hastily extended there at the end of 1878, kept it in communication with Pietermaritzburg and Durban. After a successful engagement with the Zulus at Nyezane, Colonel Pearson and some of his troops got as far as Eshowe, about twenty-five miles into Zululand, intended to be an advanced depot on the route to King Cetshwayo's homestead at Ulundi, but they outran their supply columns and were unable to advance further. In the days that followed a number of messages were received by means of native runners, informing of the disaster at Isandlwana, and eventually, on 11 February, came the news from the commander, Lord Chelmsford, that no reinforcements could be provided. Pearson, given the option of withdrawing by Chelmsford, was reluctant to give up ground already gained but sent surplus troops back to Natal. After that the remaining garrison at Eshowe, surrounded by marauding Zulus, was besieged.

An immediate problem was to try and communicate between Fort Pearson and Eshowe. It took some time and lots of ingenuity to achieve, and it was conducted, not by trained signallers with proper equipment, but by the initiative and improvisation of those on the spot. How they did it will now be described.

The Troops Involved

To recount the events it is necessary to go back in time to January. When they disembarked from the SS *Walmer Castle* at Durban on 4 January 1879, the 2nd Field Company Royal Engineers, commanded by Captain Warren R. C. Wynne, part of the troops sent from England for the war, was needed urgently at the Tugela to carry out their normal work such as road building, bridging and fortification. There was confusion at the docks and a delay in locating their pontoon equipment, so it was decided that Lieutenant Charles Haynes and about twenty men would remain at Durban to sort out this problem and follow up as soon as possible, while Captain Wynne with the main body would move on to the Tugela immediately. When it became apparent that the muddle could not be resolved quickly (ships had been loaded incorrectly in England), and after an exchange of telegrams with Fort Pearson, Haynes was ordered on 16 January to follow up without the missing equipment. By the time he reached Fort Pearson Wynne and the rest of the Company had gone to Eshowe with the column commander, Colonel Pearson, and were now besieged there in the KwaMondi mission station, just to the east of the present town. The resourceful Haynes decided on his own initiative to do something about communicating with them. Lord Chelmsford, in command and now at Fort Pearson, was sceptical.

The distinction between telegraphy and signalling should perhaps be explained at this point. It was contemporary usage for 'telegraphy' to refer to the *electric* telegraph and 'signalling' to refer to *visual* signalling, even though the purist would be correct in saying that telegraphy, literally 'writing at a distance', applies to both. In this article 'signalling' refers to visual signalling.

Signalling from Fort Pearson

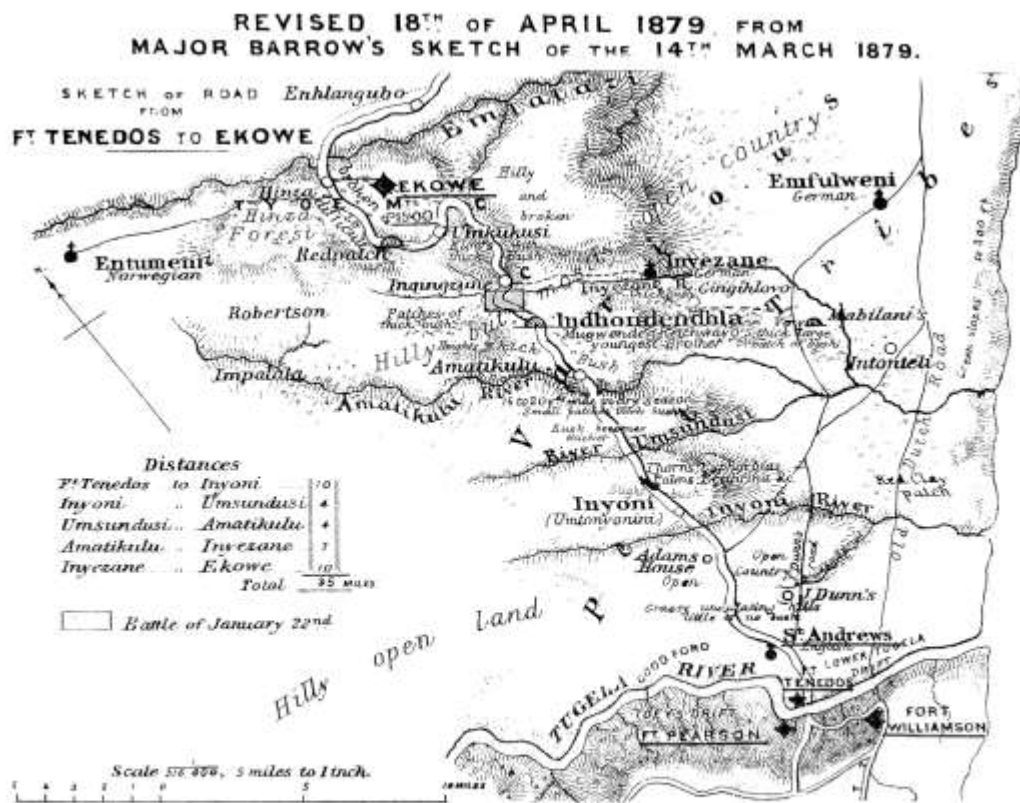
The mission station at Eshowe, some twenty-two miles away to the north and 2,000 feet higher, was in fact visible from the area near Fort Pearson. A correspondent of the Western Morning News reported how things started. There were neither proper heliograph instruments nor skilled signallers available, so:

... it occurred to Lieutenant Charles Haynes ... that by means of the heliograph the rays of the sun might be made to do the duty [of communicating with Eshowe]. On suggesting this to Lord Chelmsford the general was far from sanguine, while his staff were more than incredulous. Nevertheless, permission to try was given. The difficulties were formidable. In the first place no mirrors were obtainable, and a small bedroom looking glass had to do the duty ... and all the apparatus was of the roughest. ... One morning Lieutenant Haynes sallied forth to a hill four miles distant [from Fort Pearson], whence the tower of Ekowe [Eshowe] church was visible. When all

was adjusted, signalling began, and was continued with patience day by day, whenever a gleam of sunlight was obtainable, but a whole week elapsed before any indication was obtained from the beleaguered men that his flashes were observed ... and long after a less persevering man would have given up the trial an answering gleam was seen from the Ekowe church tower. The reward of success was great and the gallant officer had the honour of receiving Lord Chelmsford's personal thanks for his ingenuity and patience. 1

Because of the mention of mirrors and, synonymously, a looking-glass, it is obvious that the word 'heliograph' in this quotation is used in its literal sense – *sun writing* – and does not refer to the instrument of the same name. The mirror that Haynes used was apparently acquired from Smith's Hotel, a rather grandiose description of the modest refuge for travellers overlooking the lower Tugela drift, and their last point of succour before heading across the river into Zululand.

The contemporary map below shows the ground between Fort Pearson and Eshowe. Haynes' signalling station was set up near the St Andrews mission station, north of the Tugela and some four miles from Fort Pearson.



**Contemporary map showing the ground between Fort Pearson and Eshowe.
Reproduced from a lithograph by the Intelligence Branch
of the Quartermaster General's Department, 1879**

Eshowe Gets the Message

There are a number of reports originating from those in Eshowe which describe their efforts to read the signals and to reply; they differ in some points of detail concerning exact dates and methods, but the general course of events is clear enough.

Haynes' efforts had been seen in Eshowe from early on, Wynne's Company report reading as follows:

2nd March. Great excitement this afternoon as we could see flashing signals in the direction of the Tugela, evidently meant for us.

3rd March. Signalling continued, and we read a rather imperfect message, which implied that we might expect a relieving force on or about the 13th.

4th March. Signalling quite satisfactory and we were able to reply by means of a looking glass. 2

Their ability to reply was, at this stage, an over-optimistic assessment. If seen at all, the indiscriminate flashing of their small hand-held shaving mirrors would have been unintelligible. By 5 March the signalling from Fort Pearson was more distinct and, in laborious instalments, the following message was received at Eshowe:

From Colonel Law to Colonel Pearson. About 13th instant, by General's orders I advance to your support with 1,000 men as well as natives, as far as Inyezane. Be prepared to sally out to meet me with your surplus garrison there, by signal. I may come by Dunn's road. Make answer by flag on church. 3

On 9 March a native runner from Eshowe managed to get through to Fort Pearson and the signallers there then knew that their signals were being understood. That was encouraging news. However, the despatch of the proposed relief force was postponed.

Later, after the siege was over, Lord Chelmsford wrote a despatch, mentioning the twenty-three year old Lieutenant Haynes for his resourcefulness:

For some little time we had been in communication with Colonel Pearson by means of flashing signals; for this very great assistance to our operations, I am indebted to Lieutenant Haines [sic], R.E., who, despite some failure and discouragement at first, persevered until complete success was attained. 4

Note that this despatch, written after Eshowe was relieved, refers to 'flashing signals', which is consistent with the description of a mirror being used; a 'heliograph' (*ie* instrument) is not mentioned. Also, Haynes' name is misspelt. Both these matters will be referred to later.



Lieutenant Charles Haynes

Captain Wynne's Screen

But to begin with, effective signalling was only taking place in one direction – from Fort Pearson to Eshowe. How was Eshowe going to signal back to Fort Pearson?

Captain Wynne in Eshowe was working on it – and lots of other things too, for he was responsible for every engineering task in the fortified mission station. Warren Wynne was a capable, intelligent, conscientious, and hard-working officer who, like all Royal Engineer officers at the time, had been thoroughly professionally trained in a wide spectrum of military engineering tasks during the two-and-a-half-year course at the Royal Military Academy, Woolwich, and then the School of Military Engineering at Chatham. Wynne's diary records: 5

Sunday, March 2nd. Very seedy [an ominous sign] ... Heliograph signals observed in the direction of the Tugela at about 3 pm. No message made out. Endeavoured to flash sun's rays back [with small hand mirrors, which were ineffective].

March 3rd. Today the signalling from the Tugela was observed, and some words deciphered ... This of course caused much excitement ... I determined to try and effect communication by means of a large screen raised above the ground, revolving on horizontal pivots, which, being brought alternately to a horizontal and vertical position in front of the places to be signalled to, should produce dashes and dots through the spaces of time of its appearance. 6

Wynne's own description explains how the screen was made of black canvas stretched across a frame, but he had trouble constructing and erecting it due to stormy weather. It was not successful, and he had to build another. At length, on 10 March, his diary records:

I put up a new signalling screen in the afternoon, much stronger than the last, which works well.

We signalled two or three messages to the Tugela signalling station. Signalling from thence was kept up for two or three hours. Weather fine and sunny. 7

The vital words in Wynne's description on 3 March are "should produce dashes and dots through the spaces of time of its appearance". In other words, this was not a heliograph of any sort; he was not flashing the sun, but simply moving the screen on its horizontal pivots so that it was seen or not according to its position – straightforward visual signalling. It was a hybrid form of shutter telegraph, using but one large 'shutter' and signalling the letters using the Morse code. The normal form of shutter telegraph used an array of shutters and a semaphore signalling code to represent the letters, but this method would have been unreadable over the distance involved. The rate of transmission using Wynne's single screen, and Morse code to signal the letters, must have been exceedingly slow. It was a brave attempt, but not very effective.

On 12 March, Captain Warren Wynne, a much-respected officer who had assumed command of the 2nd Field Company RE and been despatched on the campaign at very short notice, was incapacitated by enteric fever. His diary stopped abruptly, but he continued to write letters to his wife for a while longer. He died on 9 April 1879, his thirty-sixth birthday, leaving a widow in England (his second wife, the first having died after a short marriage) and four young children.⁸ His widow, Lucy, never remarried and drew her army officers widow's pension for sixty-seven years until her death on 2 June 1946, aged ninety-four. 9

Captain MacGregor's Improvised Heliostat

Captain Henry Grey MacGregor, 29th (later the Worcestershire) Regiment, the D.A.Q.M.G. at Eshowe, who Colonel Pearson had placed in charge of signalling there (and not to be confused with Lieutenant John MacGregor of the Telegraph Troop, who featured in Part 1 of this article), wrote a letter to a friend, saying on 7 March:

Many devices are now being tried to flash signals back to the Tugela, or rather to a point about 7 miles this side of the lower Tugela Drift, and 3 miles the other side (south) of the Inyoni, whence we believe the flashing is made, about 20 miles from us. The flashes are very distinct and easily read. Our difficulty is to flash straight upon them. Wynne has put up a big screen 12ft x 10ft, moveable round a horizontal axis on high supports, placed on our skyline. We are now trying to send messages but, as the day is cloudy, we do not know whether our friends can read. ... But I have no doubt whatever that we shall be able to communicate the first favourable day. 10

Then a breakthrough came with the discovery of a bedroom mirror, found by a servant of one of the staff officers while rummaging in a baggage waggon at Eshowe. He took it to Captain MacGregor.¹¹ It was a much more potent object than the puny hand-held shaving mirrors that had been tried up to then. There are various stories about the construction of the so-called 'heliograph' in Eshowe but have you yet thought of the main problem they had?

The relative dispositions of the lower Tugela, Eshowe, and the sun need to be considered. As the map above shows, the line joining the area of Fort Pearson and Eshowe is almost exactly north-south, and Eshowe is at a latitude of about 29 degrees south. The sun is always to the north in these southerly latitudes. Thus, using the sun to flash from the lower Tugela northwards to Eshowe, as Haynes did, was simply a direct reflection from the mirror as the sun traversed the sky behind Eshowe. The problem was in the other direction, from Eshowe to the Tugela, where the sun was behind the mirror.

With a proper heliograph instrument this not uncommon situation is accommodated by the use of a second mirror, called the duplex mirror. The sun behind the instrument is reflected by one mirror (in practice the moveable or signalling mirror, which is provided with a means of being manually adjusted to track the sun as it moves through the sky due to the rotation of the earth) into the other mirror (the duplex mirror, which is not adjustable), and thence to the distant station. The instrument's design incorporated sighting arrangements to ensure the mirrors were accurately aligned. What the receiving station observes is the light reflected from the static duplex mirror while the heliographer at the sending station is creating the Morse code flashes with the signalling mirror that points to the sun. The diagram below illustrates this:

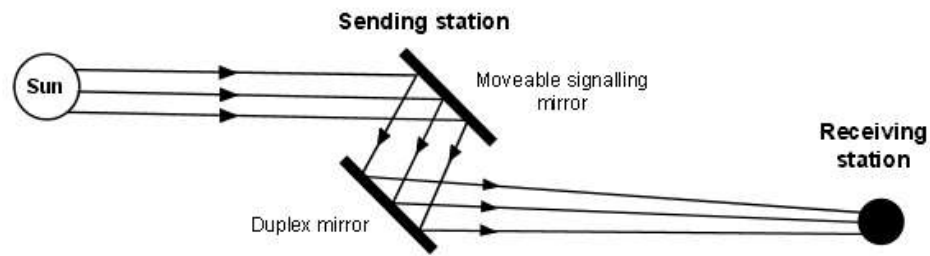


Diagram to illustrate the principle of the heliograph when the sun is behind the sending station

But there was no heliograph instrument with two mirrors at Eshowe, so some other method was needed. MacGregor's letter to his friend was continued on 28 March:

I am glad to say that I rigged up an impromptu heliostat which does work daily with the greatest success. I am making a sun dial now as we often get out of our time reckoning.

The heliostat is a device that was in use from the 1830s. It used two mirrors set at right angles and simply reflected the sun's light in a steady beam to the distant station, and had first been employed in map survey work as a beacon to locate points for triangulation purposes. The heliograph was a later development, invented by Mr (later Sir) Henry Mance in about 1869.¹²

The heliostat was subsequently adapted to signalling but worked on a different principle to the heliograph. It signalled by means of a mechanical obscuring device or shutter in front of it which interrupted the light beam (like an Aldis lamp), whereas the heliograph signalled by the movement of the spring-loaded signalling mirror which was mechanically deflected by the operation of a key acting just like a Morse key. Both types of instrument signalled using the dots and dashes of the Morse code – a code originally invented as part of Morse's 'system' for electric telegraphy in about 1835 and then adopted for visual signalling. The heliograph principle enabled faster sending speeds, which is why it superseded the heliostat.

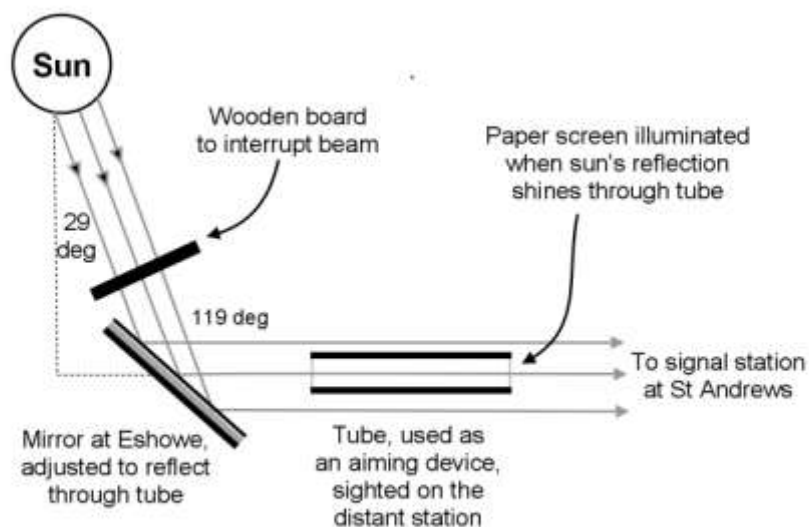
Captain MacGregor's rough-and-ready device was based on the heliostat principle, but he did not enjoy the luxury of an instrument; he had only one mirror, no shutter, and he had the sun behind him. So how did he do it? In the grounds of the besieged mission station he found a long straight piece of iron pipe – and that, he claimed, made all the difference.

On 15 March 1880, back in England and a year after he started using the heliostat in Eshowe, MacGregor, then a Major, attended a lecture on *Heliography and Army Signalling Generally* at the Royal United Service Institution. The lecturer was none other than the late Warren Wynne's brother, Major Arthur ('Barney') S. Wynne, recently returned from India where he had been Superintendent of Signalling for the then General (later Field Marshal Lord) Roberts in the successful Afghan campaign of 1878-79,¹³ and the very mirror that had been used at Eshowe was on display. In the discussion period that followed the lecture attention was drawn to the mirror by the Chairman of the meeting and MacGregor was asked to describe how the signalling from Eshowe had been achieved. This was his reply:

At each end of a long straight tube found on the ground, a small piece of paper was fixed. The tube was then aligned on the distant flash. [He probably meant to say this the other way round – align the tube first by looking through it, then affix the pieces of paper.] Next, the mirror was set up so that both pieces of paper [acting as a diffused screen] were lit by the sun's reflection, and by this means we knew that the flash was visible from the distant station. The sun was simply shut off by means of a board, of course it was the rudest possible kind of arrangement. The real difficulty was that the sun was at our back. The glass had to be sometimes almost horizontal, but it was so large that the mirror had not to be moved except perhaps every four or five minutes; that, however, occasioned a great deal of delay. The sun, being at our back, was in the worst possible position; we tried every sort of means of communicating by balloons, rockets, a very large screen almost as large as the map on the wall, flags, and bonfires at night, and they all failed. But this system at last succeeded; it was exactly this day last year that we first succeeded.¹⁴

Perhaps, on 15 March 1880, as he spoke at the RUSI, MacGregor had forgotten the date; he was a day late because, as other sources state, it was 14 March that his heliostat, sited on a prominent hill just to the south-west of the fortified mission station at Eshowe, burst into life. Signalling in both directions was now much improved.

A diagram of the general arrangement of Captain MacGregor's improvised heliostat is shown below:



*Diagram to illustrate the improvised heliostat at Eshowe.
MacGregor's method*

So there you have it, straight from the horse's mouth - or so you might think! There is, however, a little twist to the story. Also in Eshowe, commanding a company of Natal Native Pioneers but attached to the 2nd Field Company RE, was Lieutenant Thomas Ryder Main, RE. Years later, possibly using contemporary notes or diaries, he wrote his *Recollections*, in which he rather unceremoniously debunks Captain MacGregor's description:

There apparently wasn't a looking glass of any size – till suddenly the C.S.O. [Chief Staff Officer], Col. Forestier Walker, Scots Guards, produced a fine specimen, some 18 inches by 12. In the frenzy of the moment we sent flashes in the direction of Ft. Pearson to show that we were alive and kicking. Capt. Beddoes, my native scout officer, [Captain G. K. E. Beddoes, No 2 Company, Natal Native Pioneers] was a good mechanic and soon improved matters. He mounted the mirror like an ordinary looking glass, so that it could be elevated or depressed, and fixed that again on top of the barrel to allow of horizontal movement. The dousing of the light was done by a board strapped to the hand of the operator. The correct direction of the reflected ray was a difficult matter – one wisecracker [MacGregor!] produced a length of 1'' gas pipe which he picked up, & he explained that all you had to do was to look through the pipe to Ft. Pearson & then by looking through the other end see if the ray was coming down it. It took about ten minutes to get the ray through & then the man looking down the pipe was almost blinded & the ray was gone again. So we turned that down, & eventually solved the mystery in a very simple manner by two directing rods of thin iron with pens on the top. [Similar in concept to the method used by a proper heliograph instrument, which had an unsilvered aperture in the centre of the mirror, to look through, and a sighting arm acting like the foresight of a rifle.] This arrangement was not perfect, but we were at last once more in communication with the outer world. The mirror eventually came to a sad end. After the war it was presented to the United Services museum, but in passing it round at a lecture it slipped from the hands of an old General, & was smashed to pieces. [Assuming it was the lecture described above, that mishap was tactfully not recorded in the Proceedings and the old General remains anonymous!]

After this, messages came through thickly including one of encouragement from Queen Victoria. 15

The two methods used to align the mirror, one using sighting rods and the other using the length of pipe, were sketched in the *Illustrated London News* of 31 May 1879 and are reproduced below. One may ask why MacGregor did not mention the sighting rods at the RUSI lecture, especially as during the course of the lecture that method of aligning the mirror had been described by the lecturer and was well-known to experienced heliographers. Perhaps it was personal pride – helped by the fact that Main and Beddoes were not present. In support of MacGregor it should be said that Captain Knight, in his

Reminiscences of Etchowe, describes MacGregor's method as the one used. A summary of MacGregor's career, culminating as ADC to the Queen, will be found in the endnote. 16



Beddoes' method, with sighting rods



MacGregor's method, with sighting tube

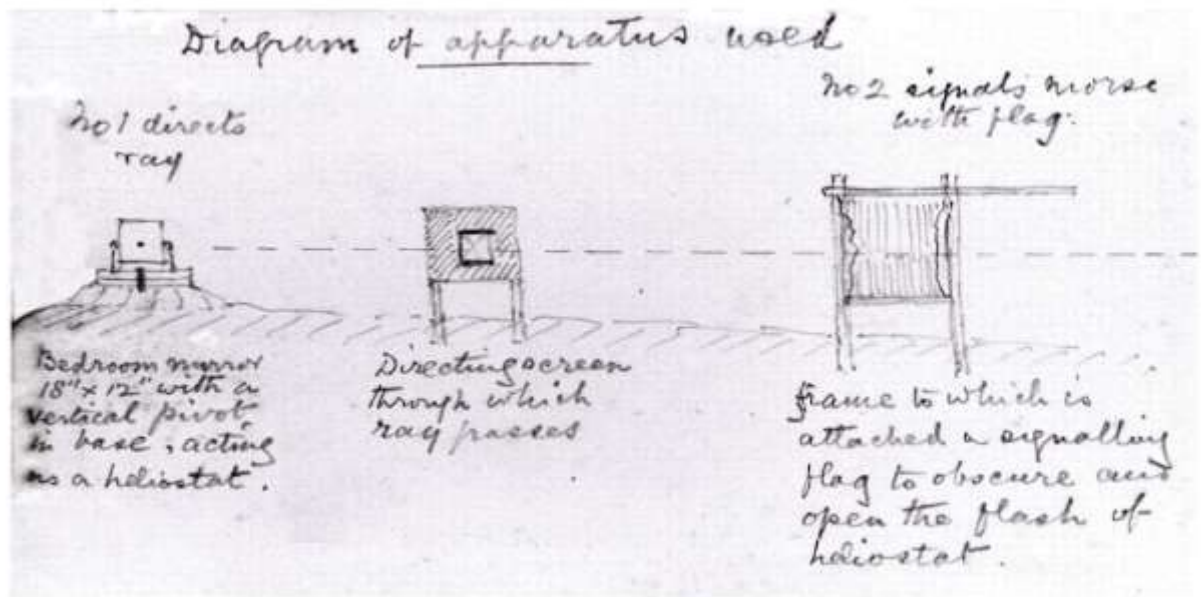
Whichever method of aligning the mirror was used – and that is the only essential difference between the two versions - they were lucky that the signalling was conducted at about the time of the equinox in late March. By definition, at the equinox (21 March – right in the middle of the period the heliostat was used at Eshowe) the sun at noon is over the equator and the angle of the sun to Eshowe was its latitude, 29 degrees. Thus by simple geometry the angle between the sun, the mirror, and the distant signalling station at noon was 119 degrees (these angles are shown in the diagram of MacGregor's heliostat above). This obtuse angle increased as the sun was lower in the sky either side of midday. Had the siege been a month or so later the sun behind them, moving towards its northern solstice, would at that latitude have become too low in the sky to enable this single-mirror method to work. MacGregor described how the mirror was almost horizontal, and even in late March there would only have been a few hours either side of noon, when the sun was at its highest, that signalling could be carried out with only a single mirror.

What is certain, from the descriptions of the participants that have been quoted above, is that neither Wynne and MacGregor at Eshowe, nor Haynes near Fort Pearson had a proper heliograph instrument, and these communications were set up by their initiative and ingenuity, basic devices, and a rudimentary knowledge of signalling and the Morse code.

The St Andrews Signalling Station Message Book

This intriguing little book records the messages sent and received at the signalling station. A small, hard-back, ruled cash book measuring some four inches by seven inches, it was presumably the only thing available to Lieutenant Haynes at the time. Held in the museum of the Royal Engineers, it remains quite legible.

It begins with a diagram sketched by Haynes on the inside cover illustrating the set-up of the signalling station, reproduced below.



The diagram in the St Andrews Mission Station signalling log book, drawn by Lieutenant Haynes

How it works probably now needs little additional explanation. The centre spot of the mirror is clearly marked in the original diagram, and Haynes will have removed the silvering from the back of the mirror so that he could look through the centre of it, exactly as if using a heliograph instrument. The reflection of the sun from the mirror would thus have a centre shadow spot. The mirror was aimed like a rifle, looking through the aperture (analogous to the rear sight of the rifle) and lining up the cross wires (the foresight) and the target, in this case the mission station at Eshowe. The angle of the mirror was adjusted relative to the sun so that the shadow spot fell on the cross wires of the directing screen. The mirror was now aligned to reflect to the distant station, and the Morse code was flashed by interrupting the beam with the signalling flag – not quite the use for which the flag was intended, but effective nevertheless.

The book lists the messages - sent messages on the left-hand pages and received messages on the right-hand pages, all with dates. The messages are simply text – no formal message procedure was used, even though message forms then existed. Answers were often commendably brief – “Yes” or “No”. Its completeness is questionable, and it seems likely that a number of private messages were not recorded, although some were. For example, the oft-repeated anecdote about how Colonel Pearson signalled to enquire about the condition of his expectant wife in Natal (getting the response from Fort Pearson that “Mrs Pearson is ...”, at which point the message was interrupted by heavy cloud obscuring the sun for some time before continuing “...well, and delivered of a baby daughter”) does not appear as one of the messages received or sent. 17

The early messages deal with the initial endeavours to relieve Eshowe. After 14 March, when heliostat signalling from Eshowe began, the scope widens. Much of it becomes mundane administrative chatter (revealing, for example, that the biscuits held by the garrison in Eshowe had gone mouldy). Personal messages include such things as a message from Captain MacGregor to be sent by telegraph from Fort Pearson to his wife in Vanbrugh Park, Blackheath, London to the effect that he was “quite well”, and to Mrs Pearson stating that “Col and all married Buffs well.” Lady Frere sent a message of encouragement. There is no mention of the message alleged by Main to have been sent by Queen Victoria - perhaps years afterwards he confused her with Lady Frere. On 24 March Lord Chelmsford arrived on the scene and, getting a grip on what had become rather idle chatter, ordered Eshowe that “unimportant private messages are not to be flashed”, adding: “Am here and will come out tomorrow if fine and talk.” And that is exactly what he did, because there is another sketch, to be shown below, with Chelmsford at the signalling station and it is dated 25 March. From then on messages deal with operational plans and requests for information concerning the impending relief of Eshowe, and relatively detailed reports of the actions by the western column at Hlobane and Khambula in late March.

Artistic Licence

Now comes an enigma. The practical endeavours of these men and their improvised method of signalling was perhaps led astray by the work of a war correspondent – one of those breed who, in 1873 in the first edition of his *Soldier's Pocket Book*, the acerbic Wolseley described as “those newly invented curses to armies, who eat the rations of fighting men, and do no work at all”. (Today's media arrangements would surely have driven Wolseley to acute apoplexy.)

The signalling from the lower Tugela was allegedly sketched by Melton Prior, the *Illustrated London News* special correspondent who covered the campaign. Together with an early batch of reinforcements, he arrived in Durban in late March aboard the SS *German*. His sketch, published in the *Illustrated London News* on 24 May 1879 and reproduced below, shows a heliograph instrument being used. This is not what any of the evidence presented so far has indicated, arousing suspicion.



The sketch produced by Melton Prior of the Illustrated London News. As the text explains, it is extremely unlikely that he ever visited the signalling station at St Andrews, and the sketch is inaccurate and misleading. The signalling was achieved by a mirror, not a heliograph instrument

A little investigation led the author to Prior's autobiography, *The Campaigns of a War Correspondent*, relating his curious story of a bad dream in which he imagined he would be killed near the Tugela River. He even claimed to have had a letter from his mother telling him that she, too, had had a similar dream that he had gone to Eshowe with the relieving column and been killed, and that she had seen his funeral. (How his mother in England knew that Eshowe needed to be relieved, much less the plan for its relief, and then managed to communicate by letter in time - a month at best - is beyond belief.) In the book he admits to only a brief overnight stay at Fort Pearson to see the troops set off to relieve Eshowe, before he returned in a funk to Durban early the next morning while the other correspondents accompanied the advancing force.

He [a Mr Walter Peace, in Durban] ... informed me he was going to the Tugela, whence the troops were to start for the relief of Colonel Pearson at Etchowe. He had already engaged a carriage and offered me a seat, so I had the opportunity of seeing the troops and making a sketch of them starting on the expedition, and I slept the night in the tent of the commissary, General Strickland. He was very kind to us, and gave us breakfast, and then we started back, and I arrived once more in Durban, feeling rather ashamed of my want of pluck.

During the time that the column was operating for the relief of Colonel Pearson I was engaged sketching the arrival of fresh troops from England, and the many interesting scenes to be found in Durban. 18

Prior had meanwhile made arrangements for Lieutenant Colonel John North Crealock, Chelmsford's Military Secretary, a competent amateur artist who produced many sketches of the war, and a private individual named Porter, to supply him with sketches.

During his brief overnight sojourn at Fort Pearson to see the troops depart to relieve Eshowe, and taking into account the time available and his state of mind, it is doubtful if he ever went to see for himself the signalling station near St Andrews, some four miles away across the Tugela river. He may have been told about 'the heliograph', jumped to the wrong conclusion and, back in the comfort of his hotel in Durban, used his past experience and imagination to sketch a heliograph station. Either he, or the staff artists back in the drawing office in England, produced the unrealistic picture of a heliograph

station as though it were at some ceremonial display. It would, after all, have made better 'copy' for the magazine, more pleasing to the editor and the readership, than some chaps crudely messing about with a mirror. It is this over-embellishment and excessive use of artistic licence which destroys confidence in the credibility of the picture.

Semantics may enter the argument. The loose use of the word 'heliograph' was open to misinterpretation, as has already been suggested. A heliograph, quite literally translated as *sun-writing*, is any device that can send a message by flashing the light of the sun. It may be a simple mirror or any other reflecting device. The same term is also applied to the visual signalling instrument which was specifically designed to do this, which is what most people immediately assume it to be, and some did not know the difference between a heliostat and a heliograph. It becomes rather esoteric, so 'heliograph' was probably used by most people to cover everything.

Then a technical point. Looking at the sketch, it may at first appear that there are two heliograph instruments, but the 'second' one (left foreground) is probably the duplex mirror (explained above), which in the early pattern of Mance's design of heliograph instrument was mounted on a separate tripod. Later designs, including the Roorkee heliograph, built in the workshops of the Bengal Sappers and Miners, which came to Zululand just as the war ended, mounted the duplex mirror on the same tripod and head assembly as the signalling mirror.¹⁹ As already explained, there was never any need for the duplex mirror when signalling northwards from the area of Fort Pearson, so it would have been unusual that a heliograph station there would ever have deployed it. In particular, the mirror, which was prone to damage, would have been kept in its leather carrying case for protection when not in use.

Another sketch of the signalling station near Fort Pearson, perhaps less well known and earning fewer marks for artistic merit, was drawn by Chelmsford's Military Secretary, Lieutenant-Colonel J. N. Crealock of the 95th (later Derbyshire) Regiment,²⁰ who, it will be recalled, had undertaken to sketch for Melton Prior. It is entitled *Signalling to Ekowe by sun flashing*. Accurately titled, and dated 25 March 1879, it shows no heliograph, but instead a mirror (just visible behind the telescope's forward bipod) and a telescope sighted on Eshowe looking for flashing signals in reply. It matches the description of the signalling station given in the diagram at the front of the St Andrews signalling station message book, and the date is accurate (Chelmsford said he was going to the signalling station on that day). It has the ring of authenticity. Crealock's sketch is reproduced below.



*The officers named in the sketch are (L to R): Lt Milne, RN, ADC; Col Crealock (Lt Col Crealock, the artist, who apparently indulged in a harmless bit of artistic licence by including himself in the sketch); no name; Lt Haines, RE *; Capt F.L. Story, 99th Regt (looking through the telescope); Commodore T. W. Richards, RN, (with sword); and Lord Chelmsford.*

(The name, written rather indistinctly on the sketch, appears at first sight to read as Harris, but there was no Lt Harris RE at the time. It is Haines, incorrectly spelt, as it also was in the London Gazette on 6 May 1879 when he was mentioned in despatches for his work in establishing communication with Eshowe. The despatch, although published under Chelmsford's name, was probably written by Crealock, who was both the Military Secretary and the artist – at least he was consistent! It should be spelt Haynes, and indeed it would have been surprising if Haynes were not at the signalling station for the Commander's visit.)*

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So which is right? It is clear from the numerous contemporary descriptions that have been quoted above, that no proper instruments were available either in Fort Pearson or Eshowe, and something that did the task had to be constructed from whatever was available. Lord Chelmsford would not have been sceptical if a proper heliograph instrument designed for such a purpose was available; he was sceptical because Haynes proposed to make something from whatever he could lay his hands on to communicate over twenty miles, and he would not have mentioned Haynes in despatches (when, after Eshowe was relieved, he wrote about ‘flashing signals’) simply for operating a heliograph instrument. Also, if it were a proper heliograph instrument at the lower Tugela, the people at Eshowe would have immediately recognised it as such and the dots and dashes of the Morse code would have been well formed and easily enough read; they would not have taken days to read a message while the crude apparatus was improved. It is also consistent with reports of the main signalling operations that formed Part 1 of this article, which described the shortage of heliograph instruments – even after the reinforcements had all arrived only six instruments could be assembled for the main advance from Landman’s Drift to Ulundi beginning in late May, although more arrived later. However, the precise number of instruments in the theatre, and when and how they came, is obscure.

It was 25 March when Crealock dated his sketch depicting a mirror and 28/29 March when, in strange circumstances, Melton Prior paid his fleeting visit to see the troops departing to relieve Eshowe. Did the troops at Fort Pearson acquire heliograph instruments from some source during the last few days of the siege, for by that time reinforcements had arrived in Durban and moved forward? The quality of the reinforcements, poorly trained and hastily assembled from whatever was available, would suggest that skilled signallers with heliograph instruments was far too much to expect (refer back to Part 1 for a description of the ineffective state of regimental signalling). Haynes’ signal station message book makes no mention of a heliograph instrument. The sudden arrival of a heliograph instrument at Fort Pearson, with people who knew how to use it, is a highly unlikely scenario. Altogether, there are too many unanswered questions. It has to be concluded that there were no heliograph instruments and that, even allowing for artistic licence, Prior’s sketch is historically inaccurate and misleading – just a product of his imagination, or perhaps, based on a written description mentioning a ‘heliograph’, concocted entirely by artists in the drawing office of the Illustrated London News back in England.

After a ten week siege Eshowe was eventually relieved on 3 April 1879, the day after the battle of Gingindlovu. The St Andrews signalling station message book records that on 3 April there was no sun, on 4 April a short message was sent, and on 5 April, “Ekowe being evacuated, signalling was here stopped. Signed: C. E. Haynes Lt R.E.” Whether he returned the mirror to Smith’s Hotel is not recorded! By 7 April the troops were back at the Tugela where they had started on 12 January.

The Present Day

Nowadays, the N2 motorway runs north from Durban and crosses the Tugela river on a modern bridge right beside the hill where Fort Pearson once stood, and the site itself has become a small game reserve. As for Eshowe, it has become a bustling place: there are microwave radio towers relaying countless telephone calls, e-mails, and providing access to the internet; there are banks with hole-in-the-wall machines from which, using a piece of plastic, one may draw cash from one’s account anywhere in the world; and there are people using mobile phones, shops selling personal computers and offering computer training, and other shops advertising the installation and repair of satellite television aerials, and so on.

These things would be quite beyond the ken of the participants in the Zulu war, and it is fascinating to muse on what Charles Haynes, Warren Wynne, Henry MacGregor, *et al*, struggling with screens, mirrors, pipes, sighting rods, and the vagaries of the sun, not to mention their other problems, would have thought about communications today. They would probably have found it as difficult to come to terms with all that as we would find it to accept the sort of life they led.

References

1. Royal Engineers Journal, 1 May 1879.
2. Royal Engineers Journal, 2 June 1879.
3. Narrative of the Field Operations, The Zulu War of 1879. Intelligence Branch of the QMG’s Department, Horse Guards, War Office. Pub 1881. (The Intelligence Branch was under the Quartermaster-General from 1873 to 1882. From 1882 it was under the Adjutant-General’s Department.)
4. Despatch from Lord Chelmsford dated 10 April 1879, published in the London Gazette of 7 May 1879. Haynes later served in South Africa in the Bechuanaland Expedition 1884-85, and afterwards spent a long period in appointments

- with Ordnance Survey. He retired as Colonel C. E. Haynes CB on 8 July 1912, although he was later recalled for duty in WW1. He died on 29 October 1935, aged 80.
5. Captain Warren Wynne's Zulu war diary and letters to his wife, originally a privately published book (c1880), was in 1995 reprinted under the title *A Widow-Making War*, edited by H. Whitehouse.
 6. *A Widow-Making War*, p 130. His diary on 3 March also describes the proposed design of a balloon which it was optimistically hoped would float to Natal with a message in a canister underneath.
 7. Wynne's detailed description of the screen's construction is reproduced in *A Widow-Making War*, p 138.
 8. One son by his first marriage. Obituary in the Royal Engineers Journal, 1 July 1879.
 9. Supplement to Royal Engineers Journal, July 1946, p 82. Although he never knew it, Warren Wynne was promoted to Brevet Major on 2 April, a week before he died. As a result of that, and a special award for his distinguished services, Lucy's pension was increased from £65 to £100 a year. Posthumous decorations were not at that time awarded.
 10. Royal Engineers Journal, 2 June 1879. Referring to Barrow's map, above, this description places the signalling station near the St Andrews mission station, as previously indicated.
 11. *Reminiscences of Etshowe* by Captain H. R. Knight, 2nd Bn, 3rd Regt. United Service Magazine, 1894, Vol VIII, p 592.
 12. The heliostat was used by Sir George Everest, Surveyor-General of India, in 1833. The heliograph is generally accredited to Mance, but others invented similar devices in the late 1860s. Mance seems to have been the first to put a heliograph instrument into production, in India, where it was widely used. An interesting letter on the subject of 'who invented the heliograph', written by Major J. M. Morgan RE, will be found in the Royal Engineers Journal, 1 March 1882, p 64.
 13. Major A. S. Wynne, 51st Light Infantry (2nd Yorkshire West Riding), had gained considerable practical experience of signalling in India, most recently during the Afghan campaign of 1878-79. Later, in 1881, during the first Anglo-Boer war, he was QMG for signalling with the Natal Field Force, and was responsible for planning and operating a chain of heliograph stations between Natal and Pretoria. (The duty was subsequently taken over by a telegraph line built by a section of "C" Telegraph Troop, sent out from England to repair the line destroyed by the Boers). Presumably Arthur Wynne will have visited his brother Warren's grave near Fort Pearson during this period. In 1899, in the second Anglo-Boer war, the then Colonel A. S. Wynne was Chief of Staff to General Sir Redvers Buller. After General Woodgate was killed at the battle of Spion Kop in January 1900 Wynne assumed command of 11th Brigade, and in February during the fighting around Tugela Heights gave his name to Wynne Hill. He later became Maj Gen A. S. Wynne, CB.
 14. Journal of the Royal United Service Institution, Vol XXIV, p 256.
 15. Extract from *The Recollections of Colonel T. R. Main, RE*, transcribed in February 1994 by Lt Col M. C. McCabe, RE, and Mrs Cynthia Burtenshaw. Main, who celebrated his 29th birthday during the siege of Eshowe, is believed to have kept a diary of his interesting career (in which he also served in South Africa in the last Frontier War and in the Anglo-Boer War) and later wrote his *Recollections*. I am grateful to Lt Col (Retd) Ronald MacMillan RE for drawing my attention to this document, which he retrieved from the inner depths of the RE Library where it had escaped my notice, and for help on some other matters.

Colonel Forestier-Walker, mentioned in Main's description, had been Assistant Military Secretary to Sir Bartle Frere before the war. Twenty years later, in August 1899, as Lt Gen Sir Frederick Forestier-Walker, KCB, CMG, he was appointed military commander in South Africa to replace Lt Gen Sir William Butler, one of the 'Wolseley Ring' and one of the group who accompanied Wolseley on his 'champagne and sherry' diplomatic mission to Natal in 1875. As the military commander in Cape Town in the run-up to the Anglo-Boer war, Butler's pragmatic opinions of the situation in South Africa were well out of tune with Sir Alfred Milner's high-handed political intentions, leading to Butler's premature departure. When the war started Forestier-Walker was given command of the lines of communication in the Cape, and in April 1901 he handed over this appointment to Maj Gen A. S. Wynne, mentioned above in note 13.

Continuing the digression, in Chap XIII of *Sir William Francis Butler: An Autobiography*, pub 1911, the author describes his time as Assistant Adjutant General in the Zulu War when, as Major Butler, he was responsible for administering the lines of communication in Durban "from a stifling little office" with a corrugated iron roof. "The state of confusion in Natal could hardly be exaggerated", he observed.

16. Hart's Army Lists over the period show that MacGregor was commissioned as an ensign on the 29 May 1858, became a Captain on 10 November 1869, and was *p.s.c.* (passed staff college – few in those days were thus qualified, and it was a period when many officers regarded it with disdain). He was sent on special service to the Cape of Good Hope in November 1878 and, somehow finding himself involved in the Zulu War, was firstly a staff officer to Colonel Pearson and then a Brigade Major of the 1st Brigade of the 1st Division. He was Mentioned in Despatches by Colonel Pearson and awarded the Brevet of Major. He returned to England after the war (when he attended the lecture at the RUSI as mentioned above), but then went back to take part in the first Anglo-Boer War in 1881, serving on Sir Evelyn Wood's staff as his DAA&QMG. He next served in Egypt in the operations in 1882 (commanded by General Sir Garnet Wolseley), where he was responsible for duties on the lines of communication, and was Mentioned in Despatches and awarded the Brevet of Lieutenant-Colonel. In 1884 he became DAA&QMG in York, and in 1885, as AA&QMG, took part in the Sudan Expedition and in operations at Suakin. He was then placed on half pay and on 24 November 1886, as a Colonel, became ADC to the Queen. In 1893, still ADC to the Queen, he was awarded the CB, and retired in 1895.
17. One author, C. T. Binns, in his book *The Last Zulu King*, published in 1963, elaborated on the story from his personal knowledge, saying (p 155) that "the infant is now an elderly lady living in Rhodesia".
18. Melton Prior. *The Campaigns of a War Correspondent*, pub 1912, pp 90-91.
19. Described in detail by Major Hamilton, Director of Telegraphs and Signalling in the latter part of the war, at the RUSI lecture mentioned above. Journal of the Royal United Service Institution, Vol XXIV, p 255.
20. Crealock had previously served under Lord Chelmsford, who at the time was Lt Col F. A. Thesiger, when Thesiger commanded the 95th Regiment in India in the mid-1860s.